

(19) Japan Patent Office (JP) (12) Official Publication of Unexamined Patent Application (A) (11) Patent Application Number H3-218752

(43) Publication Date  
September 26, 1991

(51) Int. Cl. <sup>5</sup> A 61 K 13/54 13/15	ID No.	Internal Filing No. 6606-3B A 41 B 13/02 6606-3B 6606-3B	E F G
		Examination Requested?	Not yet
(54) Title of the Invention	Disposable Diaper	Number of Claims 3	(Total 6 pages)
(21) Filing No.	H2-12884		
(22) Filing Date:	January 23, 1990		
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## SPECIFICATION

### 1. TITLE OF THE INVENTION DISPOSABLE DIAPER

### 2. EXTENT OF PATENT CLAIMS

#### [Claim 1]

A disposable diaper comprising a liquid permeable top sheet, a liquid impermeable back sheet, an absorbent body located between these two sheets, and side flaps that extend out in the lateral direction from both side edges in the longitudinal direction of the absorbent body, wherein the plurality of pleat parts that can freely stretch are provided on the surface of the side flaps along the absorbent body.

#### [Claim 2]

The disposable diaper according to claim 1, wherein at least a part in the longitudinal direction of each of the pleat parts is formed separate from the surface sheet.

#### [Claim 3]

The disposable diaper according to claim 1, wherein each of the pleat parts has a plurality of elastic members.

### 3. DETAILED DESCRIPTION OF THE INVENTION

#### INDUSTRIAL FIELD OF APPLICATION

The present invention relates to a disposable diaper with a construction that prevents leaking with improved fit.

#### RELATED TECHNOLOGY

Various proposals have been made in the past for constructions which prevent leaking in the crotch region of disposable diapers. For example, Japanese Unexamined Patent Applications S52-40267, S54-115939, S52-120045, and S57-89602 disclose disposable diapers which have gathers preformed using elastic members provided along the side edge part of the disposable diaper so that the diaper will be in close contact with the crotch region of the wearer in order to suppress leaking. Furthermore, Japanese Unexamined Patent Applications S59-157301 and S60-199903, and Japanese Unexamined Utility Model Application S63-60405 disclose disposable diapers that can match the dimensions of the leg circumference of the legs of the wearer and follow the movements of the wearer by providing a plurality of elastic members with different levels of elongation ratios in the side edge parts.

Furthermore, Japanese unexamined patent applications S62-250201 and S63-159501 disclose disposable diapers with sidewall parts or vertically standing elastic gathers formed in the longitudinal direction of the side flaps whereby leaks are prevented and the fit is enhanced.

#### PROBLEMS TO BE RESOLVED BY THE INVENTION

However, concerning the aforementioned leak preventing constructions, with the disposable diapers with gathers on the side flaps in the crotch region disclosed in Japanese Unexamined Patent Applications S52-40267, S54-115939, S52-120045, and S57-89602, the rigidity of the side flaps is high because of the elastic members which exist in the side flaps, and therefore the ability to follow the area around the legs is reduced. As a result, the intended fit cannot be achieved and there is a possibility that a gap will form between the diaper and the crotch region of the wearer, and therefore leaking cannot be sufficiently prevented. In particular, if the wearer is an active older toddler, there is a possibility that the absorbent body will shift while the diaper is being worn or that the diaper itself will move out of position, and thereby the risk of leaking is further increased.

Furthermore, with most products where a gather is formed by providing an elastic member between the top sheet and the back sheet, a bonding means is performed to bond the elastic member to the back sheet or the top sheet, and inevitably an unbonded region (peeling part) is formed for manufacturing purposes on both end parts in the longitudinal direction of the diaper, and this is a cause for leaking from the abdomen side or the back side through the gap formed at the peeling part when the diaper is worn.

Furthermore, with the side flaps disclosed in Japanese Unexamined Patent Applications S59-157301 and S60-199903, and Japanese Unexamined Utility Model Application S63-60405, a diaper with a vertically standing gather on each side flaps must have a high elongation ratio for the elastic member in order for the gather to stand vertically, and thereby the gather side part linearly contacts the skin so the crotch region is compressed by the gather, thus causing reddening or harming the crotch region, so the results are not always satisfactory when the diapers worn, and the same can be said for products with a sidewall part.

Therefore, an objective of the present invention is to provide a disposable diaper that has a soft fit in the crotch region and can ensure leak prevention without creating a gap, and that can prevent leaking in the waist part.

#### MEANS OF SOLVING THE PROBLEMS

As a result of diligent research concerning a construction to prevent leaking in the crotch region of a conventional disposable diaper in particular, the present inventors have discovered that the aforementioned objectives can be achieved by providing a unique resisting member with a specific shape on the flaps.

The present invention provides a disposable diaper based on the aforementioned findings, and in other words provides a disposable diaper comprising a liquid permeable top sheet, a liquid impermeable back sheet, and absorbent body located between these two sheets, and side flaps that extend out in the lateral direction from both side edges in the longitudinal direction of the absorbent body, wherein the plurality of pleat parts that can freely stretch are provided on the surface of the side flaps along the absorbent body.

#### FUNCTION

When the disposable diaper of the present invention is worn, the pleat parts that can freely stretch on the side flaps are not affected by shifting of the absorbent body that follows the movements of an active older toddler, and will softly fit to the crotch region of the wearer, a pocket construction is formed on the inside of the crotch region, the diaper is fit to the wearer while maintaining the pocket construction, and excretions are sealed in the pocket construction so that leaking can be prevented.

Furthermore, with the disposable diaper of the present invention, a plurality of elastic members are provided for each of the pleat parts, so the diaper will softly fit to the crotch region of the wearer when worn, without causing redness or harming the crotch region.

#### EMBODIMENTS

The present invention is described below based on the embodiment shown in FIG. 1 through FIG. 7. Note, FIG. 1 is a plan view showing an embodiment of the disposable

diaper of the present invention with a part of the surface cut away, FIG. 2 is a perspective view showing the disposable diaper shown in FIG. 1 curved to the top side, FIG. 3 is a cross-section view along line III-III in FIG. 2, FIG. 4 is a cross-section view along the line IV-IV in FIG. 2, FIG. 5 and FIG. 6 are drawings corresponding to FIG. 3 showing alternates embodiments of the disposable diaper of the present invention, and FIG. 7 is a cross-section view from a position on the opposite side as FIG. 3 showing yet another embodiments of the disposable diaper of the present invention.

As shown in FIG. 1, the disposable diaper 1 of the present embodiment comprises a liquid permeable top sheet 2 formed on the side that contacts with the skin of the wearer, a liquid impermeable back sheet 3 that corresponds to the top sheet 2, an absorbent body 4 that absorbs excretions and is located between the back sheet 3 and the top sheet 2, and a pair of side flaps 5, 5 that extend out in the lateral direction from both side edges in the longitudinal direction of the absorbent body, wherein the side flaps 5, 5 are integrally formed by overlapping the top sheet 2 and the back sheet 3. Note, with the present embodiment, cutaways 5A, 5A are formed to match the shape of the crotch region essentially in the center of the outer side edge of the side flaps 5, 5.

Furthermore, leak resistant members 6 with a pair of pleat parts 6A, 6A that are formed to freely stretch are provided along the side edge in the longitudinal direction of the absorbent body 4 on the top surface of the side flaps 5, and the leak resistant members 6 are formed so as to cover across from the side flaps 5 to the inner side of the absorbent body 4. The pleat parts 6A include at least one thread-like elastic member 7, and have a construction that can freely stretch in the longitudinal direction. In other words, the disposable diaper 1 has a construction such that when the disposable diaper 1 is in an opened condition as shown in FIG. 1, the elastic member 7 is in an elongated condition, and is always pulling the disposable diaper 1 to the inside in the longitudinal direction, and when the disposable diaper 1 is in use, the disposable diaper 1 is curved to the top surface side as shown in FIG. 2 and the pleat parts 6A, 6A of the leak resistant members 6, 6 stand vertically, and a pocket structure is formed in the crotch region by the pleat parts 6A, 6A of the leak resistant members 6, 6, and furthermore, the pleat parts 6A, 6A on the inside of the leak resistant members 6, 6 are located to the inside of the absorbent body 4 as shown in FIG. 3.

Note, tape fasteners 8, 8 are attached to the side flaps 5, 5 on the back side of the disposable diaper 1.

Next, the leak resistant member 6 is described below in further detail based on FIG. 3 and FIG. 4.

The absorbent body 4 is attached onto the back sheet 3, and the entire absorbent body 4 is bonded to and covered by the top sheet 2, and is attached such that a free edge is formed by the side edge in the longitudinal direction of the leak resistant member 6 and the leak resistant members 6 form a fastening part 9 in the longitudinal direction with a fixed width along the side edge in the longitudinal direction of the absorbent body 4 on

the top sheet 2. Furthermore, the free edge is folded over to the top sheet 2 side and the elastic member 7 is enclosed in the folded over part that is formed to make the pleat part 6A. Note, the leak resistant member 6 is attached to the top sheet 2 by bonding with an adhesive such as a hot melt adhesive or by thermal welding or the like using ultrasonic waves, but attaching by a thermal welding using ultrasonic waves is preferable in order to improve the texture when in use.

Furthermore, as shown in FIG. 4, the elastic member 7 does not extend to the regions at both ends in the longitudinal direction of the leak resistant member 6, and both side edges in the longitudinal direction of the leak resistant member 6 are folded over as described above at both end regions which do not contain the elastic member 7, and is fastened to the top sheet 2 so as to form a plurality of fastening parts 9 on the inside. In other words, the pleat parts 6A, 6A are formed with the crotch region at the center.

Furthermore, the fastening part 9 of the leak resistant member 6 can be formed in any location between the side flaps 5, but from the perspective of the fastening properties and providing an effective pocket structure, is preferably within 50 mm, and more preferably within 30 mm toward the outside from the side edge in the longitudinal direction of the absorbent body 4. The pleat parts 6A, 6A preferably have a length in the lateral direction between 10 and 100 mm, and more preferably the pleat part 6A on the inner side is approximately 35 mm, and the pleat part 6A on the outer side is approximately 15 mm.

Furthermore, the top sheet 2 is preferably formed from a fiber nonwoven material or a porous plastic film or the like, the back sheet 3 is preferably formed from a moisture permeable plastic film or the like, the leak resistant member 6 is preferably formed from a fiber nonwoven material or a porous plastic film or the like similar to the top sheet 2, the absorbent body 5 is preferably formed from a material that combines fibrillated pulp as a main material with an absorbent polymer, and the elastic member 7 is preferably formed from an elastic member that can stretch freely such as strips or threads of polyurethane film or natural rubber or the like. Furthermore, the top sheet 2 is preferably formed from a hydrophilic material, and the leak resistant member 6 is preferably formed from a water repellent material.

The disposable diaper 1 of the present embodiment is formed as described above, and therefore when the diaper is in use, the disposable diaper 1 is pulled and curved toward the top sheet 2 by the elastic members 7, 7 of the pleat parts 6A, 6A, and the pleat parts 6A, 6A stand vertically to form a three-dimensional gather (refer to FIG. 1). When the disposable diaper 1 is worn by fastening in this condition to the waist part using the tape fasteners 8, 8, the cutaway parts 5A, 5A of the side flaps 5, 5 will encircle the crotch region and the pleat parts 6A, 6A will softly fit to the crotch region and form a pocket structure in the crotch region where the inside is sealed from the outside. At this time, the pleat parts 6A, 6A will form a soft plane to seal off the crotch region of the wearer, and therefore reddening and scratching of the crotch region will not occur. Furthermore, this disposable diaper 1 does not have an elastic member 7 between the top sheet 2 and the back sheet 3 as with a conventional example, and therefore the top sheet 2 and the

back sheet 3 which form the side flaps 5, 5 will be in close contact, a gap will not formed, and ensuring leak prevention from the waist part.

Furthermore, this disposable diaper 1 provides the basic performance with regards to leak and fit, and is also visually superior.

Furthermore, with this disposable diaper 1, the pleat parts 6A, 6A that form the three-dimensional gathers can be fastened simply by attaching to the disposable diaper 1 in a prescribed position, and therefore when manufacturing, the process is simple, high-speed manufacturing can be performed, and production efficiency can be increased.

Furthermore, FIG. 5 shows another embodiment of the present invention, and as shown in this diagram, the construction is similar to the previous embodiment, except that the pleat parts 6A, 6A of the disposable diaper 1 of this embodiment contain 2 thread-like elastic members and are formed as flat surfaces with a prescribed width. Furthermore, the pleat parts 6A, 6A rise vertically when the disposable diaper 1 is in a curved condition, and the pleat part 6A on the inside is position above the top sheet 2 that covers the absorbent body 4, and is formed in a position to the inside of the side edge in the longitudinal direction of the absorbent body 4. Furthermore, of the elastic members 7, 7 in the inner pleat part 6A, the elongation ratio of the elastic member 7 on the side nearest the fastening part 9 is set to be larger than the elongation ratio of the elastic member on the furthest side, and for the elastic members 7, 7 in the outer pleat parts 6A, the elongation ratio for the elastic member 7 near the fastening part 9 is set to be higher than that of the farther elastic member 7.

Furthermore, the flat surface part of the plated part 6A is preferably formed to be between 5 and 20 mm, and more preferably is approximately 10 mm. Note, if the elastic member 7 is formed from 1 strip, the width should be formed to a dimension that achieves the aforementioned width of the flat surface part in the free condition. Therefore, with the disposable diaper 1 of the present embodiment, the pleat part 6A, 6A will fit to the crotch region in the flat surface part, and further ensuring the prevention of leaking of excretions.

Furthermore, FIG. 6 shows yet another embodiment of the present invention, and as shown in the figure, the disposable diaper 1 of this embodiment is similar in every way he to the first embodiment except that an additional leak resistant member 6' is attached so as to form a fastening part 9' on the top surface of the leak resistant member 6 in addition to the leak resistant member 6 of the disposable diaper 1 of the embodiments shown in FIG. 1 through FIG. 4. Furthermore, as shown in FIG. 6, the additional leak resistant member 6' is formed with a width that is narrower than the leak resistant member 6, the elastic member 7' is set to have a higher elongation ratio than the other elastic members 7, and as shown in FIG. 6, the pleat part 6'A is formed so as to stand higher than the other pleat parts 6A.

Therefore, with the disposable diaper 1 of this embodiment, two three-dimensional gathers which slope towards the inside of the absorbent body 4 are formed,

resulting in a more secure fit to the crotch region of the wearer from the groin region to the thigh region.

Furthermore, FIG. 7 is a diagram showing yet another embodiment of the present invention, and as shown in this figure, with the disposable diaper 1 of this embodiment, the inner side of the side flaps 6 are formed by the top sheet 2, and the outer side is formed by the leak resistant member 6, the elastic member 7 is provided only on the inner side bench of the leak resistant member 6, and similar to the embodiment shown in FIG. 6, in other leak resistant member 6' is provided on the top surface of the leak resistant member 6. Therefore, with this embodiment, two 3-dimensional gathers that slope towards the inside of the absorbent body 4 are formed and therefore at the same effects as the third embodiment can be expected.

Nope, with the disposable diaper 1 of each of the aforementioned embodiments, the absorbent body's 4 were described as being rectangular, but the fit can be further enhanced if these absorbent bodies 4 are formed in a curve that matches the cutaway part 5A, 5A of the side flaps 5, 5.

Furthermore, with the disposable diaper 1 of the aforementioned embodiments, both end parts in the longitudinal direction of the absorbent body 4 were covered by the back sheet 3 or by a different leak preventing sheet, and leaking at the waist parts can be more effectively prevented by providing another elastic member in the waist part.

#### EFFECT OF THE INVENTION

The disposable diaper of the present invention can provide a soft fit to the crotch region without creating a gap in order to ensure leak prevention, and can thus prevent leaking in the waist region.

#### 4. BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view showing an embodiment of the disposable diaper of the present invention with a part of the surface cut away, FIG. 2 is a perspective view showing the disposable diaper shown in FIG. 1 curved to the top side, FIG. 3 is a cross-section view along line III-III in FIG. 2, FIG. 4 is a cross-section view along the line IV-IV in FIG. 2, FIG. 5 and FIG. 6 are drawings corresponding to FIG. 3 showing alternates embodiments of the disposable diaper of the present invention, and FIG. 7 is a cross-section view from a position on the opposite side as FIG. 3 showing yet another embodiment of the disposable diaper of the present invention.

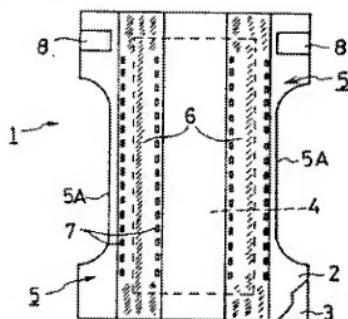
- 1: disposable diaper
- 2: top sheet
- 3: back sheet
- 4: absorbent body
- 5: side flap
- 6, 6': leak resistant member

Case #: JP03-218752A  
Ref #: 9523 (JP)

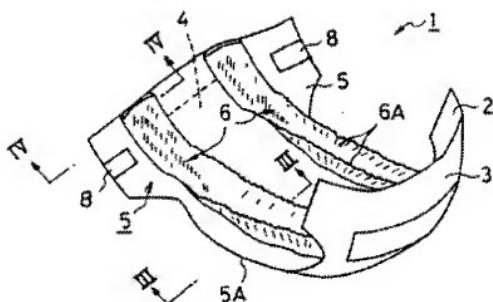
6A, 6'A: pleat part  
7, 7': elastic member

Applicant: Kao Corporation  
Agent: Osamu HATORI, Patent Attorney

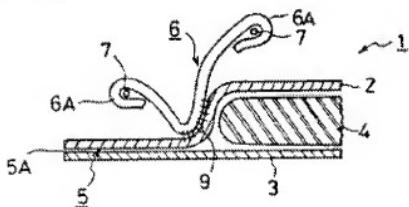
[FIG. 1]



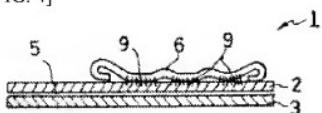
[FIG. 2]



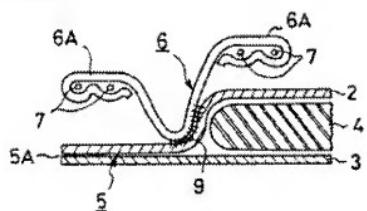
[FIG. 3]



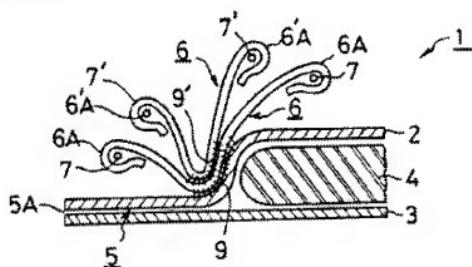
[FIG. 4]



[FIG. 5]



[FIG. 6]



[FIG. 7]

